

BASIC CONCEPTS OF: MPLS

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The main objective of the thesis is to investigate and study MPLS (multi-protocol label switching), its background and technology basics, to define what is MPLS, its features and concepts.

MPLS (Multi-protocol label switching) is a technology that enables very fast switching of data. MPLS is packet forwarding method using labels to make data forwarding decisions. MPLS is used to connect one site to another, both sites are connected through a service router cloud on a private tunnel.

Unlike IP routers, packet forwarding is not based on source and destination addressing MPLS labels each packet with a unique label which connected devices checks, which allows faster and more efficient data transmitting.

As networks grow it required more efficient, faster solutions to forward data, MPLS was introduced to avoid delay as it forwards data using MPLS instead of IP address. Originally MPLS was used to allow core networking devices simpler, more efficient and faster packet switching method by simplifying the header. As MPLS is a “multi-protocol” it doesn’t specify one protocol which allows various types of data to be exchanged.

MPLS labels packets with different labels, first router does a normal routing lookup but instead of finding only the next hop it finds the final destination router and adds a “label”, since the path is pre-determined devices in the path uses the label to route the traffic without any extra IP lookup. When packet reaches its final destination router it removes the label then the packet is delivered using normal IP routing. [3]

MPLS offers some great features, one of its attractive features is interface independency which means each site can use different connection method than the other, for example one site can use T1 connection and the other can use fiber optic connection and MPLS connect them all together to communicate. Furthermore, MPLS is one to many, which allows networks to connect easily and expand, from a customer perspective MPLS provides full freedom and full control on the connection between sites.

Comparing to VPN technology MPLS is not cost beneficial as it's more expensive, on the other hand MPLS provides faster performance because there is no encryption to deal with also MPLS provides guaranteed quality of service as it is reliable and secure. [4]

MPLS concepts is divided in two parts Edge and Core, at edge the edge labels switch router (ATM switch or router) classifies packets and label them (Label Impastation). In core Label switch router (ATM switch+ Label switch or router) forward using labels, each label indicates service class and destination which is known as Label swapping or switching. At the other Edge the Edge label switch router is responsible for removing labels and forward packets (label disposition). This Label distribution provides the ability to setup bandwidth guaranteed paths in addition to providing fast and reliable data transmission. [1]

Conclusion

It can be concluded that Multiprotocol Label Switching (MPLS) enables Service Providers and customers a simple and efficient solution with its scalability and reliability. By allowing enterprises to expand their networks and by adding additional sites without any additional configurations and by its interface independency MPLS is considered a better choice for enterprises as it is more secure and reliable than VPN.

MPLS advantages:

- MPLS Label
- Quality of service
- Interface independence
- One to many

References

[1] Steve smith. Introduction to MPLS.

[2] Mayank Tripathi. MPLS explained.

[3] Richard A Steenbergen. MPLS

[4] CBT Nuggets. What is MPLS and How does it work?